Factors influencing the degree of smallholder farmer's market participation: the case study of uMkhanyakude and Zululand districts, KwaZulu Natal province of South Africa

by

Rufaro T. Mashaya

Thesis presented in partial fulfilment of the requirements for the degree of

Master of Agricultural Sciences

at

Stellenbosch University

Sustainable Agriculture, Faculty of AgriSciences

Supervisor: DR JAN C. GREYLING

March 2021

Declaration

By submitting this thesis electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the sole author thereof (save to the extent explicitly otherwise stated), that reproduction and publication thereof by Stellenbosch University will not infringe any third-party rights and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

Date: March 2021

Abstract

This study uses a multiple regression model to analyse the factors affecting the level of market participation of smallholder farmers in the two districts, uMkhanyakude, and Zululand, in the KwaZulu Natal province of South Africa. The data was collected from a total of 229 commercially orientated smallholder farms from the two districts using a questionnaire-based household survey. Multi-stage sampling was used in selecting the smallholder farmers, whereas purposive sampling was used at provincial and district level to select the study area.

The study revealed that participants have a low crop market participation of 33 percent, a very low livestock market participation of nine percent, and overall market participation of 39 percent. Channels for marketing were investigated in relation to market participation. Marketing channels for livestock had no significant difference and effect on the level of market participation. For crops, marketing channels had a substantial difference given a statistically significant effect. The smallholder farmers who mostly sold their output to their neighbour and/or local traders had a lower market participation rate compared to those who sold their crop products to a cooperative. It was found that age and field size had a statistically significant impact on the level of market participation. Age exhibited a negative relationship with market participation and field size had a positive relationship with market participation. Income was found to have a statistically insignificant impact on market participation.

Based on the findings highlighted above, it is recommended that effective policy interventions that create and sustain an enabling environment that encourages greater market participation should be put in place. Since market participation in the area is influenced by cooperative membership, age and field size, efforts should be directed to increasing land portions or sizes for younger smallholder farmers. Policies that encourage the establishment of cooperatives should also be put in place.

Opsomming

Hierdie studie maak gebruik van ’n veelvuldige regressiemodel om die faktore te analiseer wat die vlak van markdeelname van kleinboere in twee distrikte van die KwaZulu-Natal provinsie in Suid-Afrika te analiseer. Die twee distrikte is uMkhanyakude en Zululand. Die data is verkry van ’n totaal van 229 kommersieel georiënteerde kleinboere in die twee distrikte deur gebruik te maak van ’n vraelysgebaseerde huishoudelike opname. Meerstadium steekproefneming is gebruik om die kleinboere te selekteer, terwyl doelgerigte steekproefneming op ’n provinsiale en distriksvlak gebruik is om die studiegebied te selekteer.

Die studie het gewys dat deelnemers ’n lae deelname aan gewasmarkte van 33 persent gehad het, ’n baie lae deelname aan veemarkte, van nege persent, en algemene deelname aan markte van 39 persent. Bemarkingskanale is ondersoek in verhouding tot markdeelname. Bemarkingskanale vir vee het geen noemenswaardige verandering en effek op die vlak van markdeelname gehad nie. Vir gewasse het bemarkingskanale ’n wesenlike verskil getoon, gegewe ’n statisties beduidende effek. Die kleinboere wat hulle uitset hoofsaaklik aan hulle bure en/of plaaslike handelaars verkoop het, het ’n laer markdeelnamekoers gehad in vergelyking met dié wat hulle gewasprodukte aan ’n koöperasie verkoop het. Daar is gevind dat ouderdom en landgrootte ’n statisties beduidende effek op die vlak van markdeelname gehad het. Ouderdom het ’n negatiewe verhouding met markdeelname getoon en landgrootte het ’n positiewe verhouding met markdeelname getoon. Inkomste is gevind om ’n statisties onbeduidende effek op markdeelname te hê.

Op grond van die bevindinge wat hierbo uitgewys word, word daar aanbeveel dat doeltreffende beleidsingrypings in plek gesit word wat ’n bemagtigende omgewing skep en onderhou en wat groter markdeelname aanmoedig. Aangesien markdeelname in die gebied deur lidmaatskap van ’n koöperasie beïnvloed word, asook deur ouderdom en landgrootte, moet pogings ook gerig word aan die vergroting van grondporsies of -groottes vir jonger kleinboere. Beleide wat die vestiging van koöperasies aanmoedig, moet ook in plek gesit word.

This thesis is dedicated to my family, for moulding me into the lady I am and encouraging me to pursue my dreams.

Acknowledgements

I wish to express my sincere gratitude and appreciation to the following persons and institutions:

- my supervisor, Dr Jan Greyling, for his continuous support and guidance throughout my study period. Without his support, patience and professional expertise, this research would not have been realized.
- Greatly acknowledge the Kagiso Trust Fund for the financial support they provided for the research.
- The department of Agricultural Economics for the financial support
- Siphe Zantsi for sharing data and the time sacrificed explaining some terms.
- my family for always supporting, encouraging, and praying for me throughout my life.

Preface

This thesis is presented as a compilation of 5 chapters.

Chapter 1	**Introduction and background**
Chapter 2	**Literature review**
Chapter 3	**Research data and methods**
Chapter 4	**Research results**
Chapter 5	**General discussion and conclusions**

Table of Contents

List of figures

List of tables

List of equations

Chapter 1: Introduction and background

1.1 Background Information

Ensuring household food security and reducing poverty are key policy goals for most sub-Saharan African countries. The agricultural sector plays a key role in ensuring household food security and reducing poverty through its provision of food, creation of employment and generation of marketable surpluses (Sinyolo *et al*., 2014; Mdlalose, 2016). Achieving this objective is the responsibility of the estimated 570 million farmers globally of which about 500 million (84 percent) are smallholders which cultivate on less than two hectares of land (Graeub *et al.*, 2016). This is even more pronounced in Sub-Saharan Africa where more than 90 percent of farmers cultivate less than two hectares (Lowder *et al.*, 2016). This is also the case in South Africa where less than 40 000 commercial farmers produce 95 percent of agricultural output on farms with an average size of 2 113 hectares (Liebenberg, 2012, p. 29). The balance is produced by more than 1.2 million smallholder farmers, most of which cultivate less than five hectares (DAS, 2018).

Smallholder farmers face several challenges, chief among which is market access and participation. Market access is the ability of farmers to seize market opportunities whilst market participation reflects the share of own output sold on the market (Ngqangweni *et al.*, 2010). Smallholder market participation in Sub-Saharan Africa is mostly moderate to low. A study in Kenya has shown that most rural smallholder farmers sell less than 52 percent of their produce in urban markets (Omiti *et al.*, 2009). A study done in Ethiopia showed a crop output market participation of 25 percent, indicating moderate market participation (Gerbremedhin & Moti, 2010). According to Omiti *et al.* (2009), this limited market participation is partially the result of the fact that smallholder farmers market small volumes of relatively low-value products with low perishability.

Smallholder market participation in South Africa has been the subject of various studies (see for example M. Khapayi & Celliers (2016), Jari & Fraser (2009 and 2014), Makhura (2001), Randela et al. (2008), Nkunjana & Zantsi (2018), Poole (2017), Maponya *et al.* (2016) and Shuman & Epsky (1998)) with several of them covering the KwaZulu Natal (KZN) province. Sinyolo *et al*. (2017) investigated the impact of social grants on market participation in the

four districts of Harry Gwala, uMzinyathi, uMkhanyakude, and uThukela. The study found that grant recipients were 6.1 percent less likely to participate in the market. Sinyolo *et al*. (2017) argue that social grant income displaces the income required from producing and selling crops in the household budget. Maponya *et al.* (2016) studied the factors that increase the participation of smallholder vegetable, fruit, and nursery farmers in the Zululand[1] district. The study concluded that the important factors were farmer's education, experience, agricultural training and farming fulltime.

1.2 Problem Statement

Smallholder farmers in the KwaZulu Natal (KZN) province have been the subject of several studies, however, none have looked at the factors that affect the market participation of the whole range of agricultural output. There are differences in market participation for a different kind of product. Because of this difference in the market participation for a different kind of product, this research does not focus on one product but focuses on the participation rate of all products produced in the area under study. The livestock produced in the area are Cattle, Pigs, Sheep, Goats and Chickens, and the crops are Maize, Cabbage and Potato, though there are other miscellaneous crops (leafy vegetables, madumbe and carrot) produced for self-consumption.

Smallholder farmers in this research are defined as farmers who sell more than 20 percent of their produce. There is high potential in market-oriented agriculture for smallholder farmers to reduce poverty (derive livelihood and improve their standard of living). Using the data collected from 229 commercially orientated smallholder farmers this study contrasts its findings with that of previous studies to establish if the factors affecting market participation beyond the 20 percent market participation threshold are different to that of smallholders in general as found by Sinyolo *et al*. (2017) and Maponya *et al.* (2016).

[1] Specifically, the five municipalities of Mahlabathini, Nongoma, Pongola, Dumbe and Abaqulusi

1.3 Research objectives

The main objective of this study is to investigate and analyse the factors affecting the market participation of smallholder farmers in the KwaZulu Natal Province in South Africa.

For us to clearly elucidate the problem, we look at the following objectives:

a. Identifying possible marketing channels available to smallholder farmers
b. Identifying the factors that influence smallholder farmers' participation level in the market.
c. The policy implications of the study.

1.4 Hypotheses

Hypothesis 1: Smallholder farmers that have other sources of income (Non-farm income) have a lower market participation rate given lower production. Farmers with other sources of income are most likely to produce products on a farm as a source of additional food. Those that have no other source of income are likely to produce more to get income from the farm activities. Additional income reduces the incentives of a household to engage in other income-generating activities. An example is that of a study by Sinyolo *et al*. (2017), where social grants (additional non-farm income) reduced the incentives of the smallholder farmer to participate in the market, thus lowering the market participation level.

Hypothesis 2: Smallholder farmers that have access to additional land have a higher market participation rate. A farmer that has additional land, larger land, have the capacity to produce more surplus that they will put on the market, thus increased the level of market participation.

Hypothesis 3: Older smallholder farmers in terms of age have a higher market participation rate given many years of experience. Older heads of households have more experience in farming and marketing acquired over time (Abdullah *et al.*, 2018; Randela *et al*., 2008). Age also indicates increased trust between trading partners through a repeated exchange (established binding and long-term relationships with buyers) reducing the risk associated with transactions (Musara *et al*., 2018).

1.5 Outline of the study

The research is composed of 5 chapters. The research is organized as follows; Chapter 2 reviews the literature on smallholder farmers and market participation. Chapter 3 covers the area of study; the data collection methods used and summarises the data. Chapter 4 provides a discussion of the main findings from the research. The final chapter, Chapter 5 summarises the findings, draws a conclusion and discusses policy implications.

Chapter 2: A literature review

2 Introduction

In this chapter, the relevant literature relating to smallholder farmers and their market participation are analysed. The main topics reviewed include defining smallholder farmers, defining market participation, and identifying factors that pose challenges in marketing decisions among smallholder farmers. We start by discussing some definitions and the literature on smallholder farmers, and market participation and how it is measured. The chapter ends with a summary of the issues discussed in the literature review.

2.1 Smallholder Farmers

The definition of a smallholder farmer varies and remains a contentious issue since there are different ways used to define smallholder farmers. The common way used in most countries is the land size where a threshold of two hectares is used to distinguish between smallholder and commercial farmers (Hazell *et al*., 2007; Kirsten & Van Zyl, 1998; Chamberlin, 2008; Narayanan & Gulati, 2002). Any land that is two hectares or smaller is considered a smallholder farm, and those more than two hectares are classified as medium to large scale farms.

Land size is not a good measure of smallholder farmer (Chamberlin, 2008; Kirsten & Van Zyl, 1998; Narayanan & Gulati, 2002) since land size on its own does not capture the differences in land quality, enterprise, farm products and geography etc. For instance, a two-hectare irrigated farm will have high profits compared to 100 hectares of land in the drylands. Because land size is not a good measure in defining smallholder farmer, turnover or net farm income should be used to characterise farm size (Kirsten & Van Zyl, 1998; Zantsi *et al*., 2019).

According to the net revenue/ turnover way of defining a smallholder, an annual turnover of R500 000 marks the threshold between a smallholder farmer and commercial farmers (Kirsten, 2011, as cited in Zantsi *et al*., 2019).

Smallholder farmers are generally categorised into three categories, which are subsistence, commercial and emerging farmers (Jacobs, 2009; Chikazunga & Paradza, 2013). Commercial smallholder farmers are market-oriented and are successfully linked to product

value chains and input suppliers (AGRA, 2017; Masters *et al*., 2013). Subsistence smallholder farmers produce for self-consumption and engage in low-input subsistence agricultural production (Aliber & Hart, 2009; Masters *et al*., 2013). Emerging smallholder farmers, also known as semi-subsistence or semi-commercial, are those that are in between subsistence and commercial farming (Nkunjana & Zantsi, 2018; Zantsi *et al*., 2019). These farmers are defined as those who at least sell a proportion of their output and aspire to become fully commercial (Musa, 2013; Nkunjana & Zantsi, 2018; Barrett, 2008; Zantsi *et al*., 2019).

Based on the literature reviewed and according to Zantsi *et al*. (2019), South African smallholder farmers can be categorised according to land size, the main reason for farming, farm turnover, and commercial orientation. This research focused on the commercially oriented smallholder farmers, that sold at least 20 percent of their produce on the market. This group includes emerging farmers and commercial farmers. The term smallholder farmer in this research refers to this group of commercially oriented smallholder farmers.

2.2 Market participation

Different authors have suggested various definitions. Market participation is regarded as the partaking of anyone in any market-related activity which promotes the sale of production (Ehui *et al*., 2009; Key *et al*., 2000). It entails the sale of produce and the buying of inputs from the market (Gerbremedhin & Moti, 2010; Moono, 2015). In some literature, market participation is equated to commercialisation (Latt & Nieuwoudt, 1988). Jaleta *et al*. (2009) argue that commercialisation entails more than just market participation, as it includes market participation and market orientation.

Another definition of market participation is the selling of products in the market in cash or kind (Key *et al*., 2000; Otekunrin *et al*., 2019). Market participation, therefore, refers to the extent to which a household participates in the market as the seller (Gerbremedhin & Moti, 2010; Gebremedhin & Jaleta, 2012). For this study market participation is defined as the selling of agricultural output for cash. The terms market participation and market access warrant further attention since they are often used interchangeably in the literature, but there is a difference between the two.

2.2.1 Market access

According to Sikwela (2013), market access describes all skills attained that empower a farmer to get and maintain regular customers to his/her produce and acquiring a long-term marketing relationship with the customers. In simple terms, market access is defined as the ability to seize the available opportunity to sell or buy products on the market (Fraser *et al*., 2012; Ngqangweni *et al*., 2010). Market access is different from market participation in the sense that it is an enabler of market participation. For farmers to be able to sell produce on the market, i.e. market participation, access to the markets is vital (Otekunrin *et al*., 2019).

2.2.2 Measuring market participation

There is more than one way of measuring market participation. The most used methods by researchers are as follow:

Most authors express market participation as the proportion of the value of annual crop sales to the total value of crop production. Market participation is thus defined in terms of sales as a fraction of total output as the sum of all production by the household (Adepoju *et al*., 2015; Rios *et al*., 2009; Rios *et al*., 2008). The market participation or "sales index" would be zero for a household that sells nothing, and could be greater than unity for households that add value to their crop production via further processing and/or storage (Rios *et al*., 2009). This measure includes all farmers even those that have a lower level of participation.

The second method is similar to the aforementioned but with the distinction that it expresses market participation as a binary measure where farmers are classified to be a market participant if their proportion of value sold is more than 75 percent and non-participant for sales of less than 75 percent (Osmani & Hossain, 2015). According to Osmani & Hossain (2015) and Gerbremedhin & Moti (2010), market participation was used as the dependent variable and was viewed as non-participants (y=0) if the household sold less than 75 percent and participants (y=1) if more than 75 percent was sold. This method is advantageous in dealing with commercialisation. In determining the factors affecting marketing participation, this method will exclude farmers that have some level of market participation and a big proportion of smallholder farmers with a commercial orientation that have not sold anything, thereby biasing the results.

The third method as used in a study by Omiti *et al.* (2009), measured market participation as the percentage of output volume sold in the market where a depended

variable of zero was observed when a household had no surplus to sell, and 100 when the household sold all its output. This method does not result in biased results when measuring the level of participation as it includes all farmers even those without any level of market participation.

A combination of these methods was used in this study since only commercially oriented farmers, defined as farmers who sold more than 20 percent of their production, where included in the survey. This was chosen to determine if the factors affecting market participation beyond the 20 percent market participation threshold are different from those in other studies. In the selection process, market participation was measured as a percentage and farmers that had sold at least 20 percent of their produce were selected. For the estimation of variables, the proportion of the value of annual crop sales to the total value of the crop produced method was used.

2.3 Smallholder Market participation: Highlights of previous studies

Smallholder farmers in Africa face a range of constraints and barriers that makes it difficult for them to participate in the market (Okoye *et al*., 2016; Sikwela, 2013). Though smallholders in developing countries face several constraints in accessing the markets, not all studies have shown lower market participation levels.

A study done in Ethiopia showed a crop output market participation of 25 percent, indicating moderate market participation. The level of market participation was determined by the literacy of the household head, ownership of oxen, proximity to the market place and household market orientation (Gerbremedhin & Moti, 2010). It was argued that literate households have better access to information and skills to process it, and thus resulting in a positive correlation with market participation.

Ownership of oxen, any other equipment or any asset is related to market participation. This is supported by a study done by Randela *et al*., (2008) which showed that ownership of cultivation equipment was associated with timely planting that led to higher production; hence a higher probability of market participation. Key *et al*. (2000) found that there is a strong positive relationship between household ownership of transportation assets such as a cart, bicycle and motorized vehicle, and market participation. It is argued that this is because

the ownership of these assets reduces the transport costs to the marketplace (Geoffrey *et al.*, 2013).

A study by Omiti *et al*. (2009) in Kenya, showed that because of long distances to markets and lack of information on high value and perishable products, farmers do not participate effectively, and they end up producing low value and non-perishables. Mathenge *et al*. (2010), investigated market participation across different types of products and concluded that it is a difference across different commodity groups due to various factors. Perishables and high-value products require more capital for their production- and marketing process since perishables are time-sensitive and require specific modes of transportation compared to low value and non-perishables. Because of the time-sensitivity of perishables, the location and area of the farm matters and influences the decision for production and marketing of such products. A study by Omiti *et al*. (2009b) supports this statement as the results showed that in the peri-urban areas, a higher percentage of vegetables was sold than that of maize compared to the farmers in the rural areas, where more maize was sold than vegetables. Perishability influences the marketing channel choice of a household. With perishables, farmers want to minimise the risk of damage and can employ shorter channels (directly to consumers), whist with non-perishables, the goods can be stored until the desirable market with the desired offers becomes available although an additional cost will be incurred. Cash crop farmers have a high level of market participation rate as the crops are specifically grown for the market. For cash crop and other products, such as wool, cotton and tobacco, farmers automatically participate because these products are not produced for self-consumption/ personal use (Ayinke, 2011). The cash crops farmers are most likely to have long term contracts with the marketing boards, for instance, the sugarcane producing farmers will have contracts with companies such as Gledhow Sugar Company. Because of the difference in the market participation for different kind of products, this research does not focus on one product but focuses on the participation rate of all products produced in the area under study.

Sinyolo *et al*. (2017) investigated the impact of social grants on market participation in KZN and showed that the grants were associated with decreased chances of maize market participation. Households with access to social grants were likely to sell less maize on the market as there was no incentive to produce more compared to those with no access to social grants. Having other sources of incomes reduces the incentives to participate in the market.

A study by (Abdullah *et al.*, 2018) found that off-farm income results in a reduced market participation level. Smallholders with off-farm income from participating in a secondary market have low incentives to work on the farm. Available time will be devoted to off-farm activities. Contrary to this, off-farm income contributes to market participation if it is invested in farm improvement and technology. Additional non-farm income can mean that additional input is put in place, which increases productivity and more output to put in the market.

Maponya *et al*. (2016) focused on the factors enhancing market participation of vegetable-, fruit- and nursery markets. They concluded that these factors: age, education, farming experience, land acquisition, land size, water source, production inputs, crops planted, agricultural training and fulltime farmer, had a significant association to market participation.

Smallholder farmer's level of market participation in Sub-Saharan Africa is low as they rarely have a surplus to put on the market due to limited land size. Most smallholder farmers have limited land with very little to no room for expansion (Mdlalose, 2016). An example of a situation like this is in the study done by Chibanda *et al*. (2009), where a smallholder cooperative had no room to expand the one vegetable tunnel they used to grow tomatoes. In some cases, the smallholder farmer does not even own the land, and it is a challenge as it restrains private incentive for development for production, management and marketing of products (Mtombeni *et al*., 2019). A study by Maponya *et al*.(2016) indicated that there was a positive relationship among production inputs, water source, crops and market participation. The decision to participates in the market was significantly related to the amount of farm production inputs and water availability (Maponya *et al*., 2016).

Most previous studies find that household characteristics have a significant influence on output markets participation (Key *et al*., 2000; Lapar *et al*., 2003; Randela *et al*., 2008). Age affects market participation positively in that older heads of households have more experience in farming and marketing acquired over time (Abdullah *et al.*, 2018; Randela *et al*., 2008). Age also indicates increased trust between trading partners through a repeated exchange (established binding and long-term relationships with buyers) reducing the risk associated with transactions (Musara *et al*., 2018). Besides, younger people do not like farming and they want to find employment in the service sector in the urban areas (Abdullah *et al.*, 2018). On the other hand, some studies found that younger farmers participate more in the market than older ones (Adepoju *et al*., 2015; Mdlalose, 2016; Okoye *et al.*, 2016).

Young farmers tend to have a robust social network (easier access to information via these networks) and have established a good level of credibility within their network (Maponya *et al*., 2016). Younger farmers are less risk-averse, innovative and more enthusiastic to participate in the market (Abdullah *et al.*, 2018; Geoffrey *et al.*, 2013). Older smallholder farmers tend to have more dependents and more subsistence activities, become more inactive and therefore cannot participate fully in the market (Adepoju *et al*., 2015). Mbitsemunda & Karangwa (2017), argues that the lower market participation of older people maybe because they are more risk averse.

Male smallholder farmers participate more in the market compared to female smallholder farmers (Geoffrey *et al.*, 2013; Abdullah *et al.*, 2018). In the study by Abdullah *et al.* (2018) in Malakand Pakistan, all the respondents were male members of the society. This was because society is culturally a male dominant society and females are not allowed to work on farms. In Africa, there are some places with cultural barriers which hinder women from participating in the market. A positive relation between market participation and gender suggest that male smallholder farmers are more market-oriented than females. On the contrary, a study by Okoye *et al.* (2016), had different results, where female-headed households participated more in cassava markets than male-headed households.

Education empowers smallholder farmers in making an informed decision, identifying market opportunities, gaining marketing skill and knowledge that will motivate market participation. Therefore it is not surprising to realise a positive association between farming experience, education and market participation (Maponya *et al*., 2016). The education level of the household head positively influences market participation (Geoffrey *et al*., 2013; Maponya *et al*., 2016).

Most of these studies on the market participation of smallholder farmers focus on crop output. The reason is that livestock production, for example, cattle, provides draught power, organic fertilizer, and fuel (Coetzee *et al*., 2005). Livestock market studies are difficult to contact and most studies compare or analyse the livestock marketing channels. These studies compared auction versus selling at farm gate, and also looked at private sales, auctions, butcheries and abattoirs as marketing channels (Musemwa *et al.*, 2008; Ndoro *et al*., 2015). The other studies on livestock marketing investigated how Livestock Development Programmes (LDPs), other schemes or cooperatives promotes market participation, like the Okhahlamba Local Cooperative (OLC) in KwaZulu-Natal that participated more in cattle

marketing than those who were not partaking (Ngarava *et al*., 2019). A study by Ndoro *et al*, (2015) applied a transaction cost approach to the analysis of cattle marketing behaviour among smallholder farmers in KwaZulu-Natal, South Africa, testing the effects of information, negotiation, and monitoring costs on the decision to sell to private buyers, speculators or at auctions.

Another study that investigated the livestock market participation was done in Ethiopia in the highlands of Tigray and Amhara regions in northern Ethiopia on livestock (cattle and small ruminants) and livestock products (milk, butter, and cheeses). The analysis demonstrates that physical capital (ownership of different species of livestock and landholding), financial capital (crop income and non-farm income) and education were the factors influencing market participation (Ehui *et al*., 2009a).

Looking at these studies that were investigated, smallholder farmers participate in the market to some extent regardless of the constraints that they face in accessing the markets. The factors that influence the level of market participation in most of these are the age of the smallholder farmer, gender, education, ownership of assets, land size and other sources of income.

2.4 Summary

Some of the key concepts of the research, namely smallholder farmers, market participation and market access are defined in this chapter. A commercially orientated smallholder farmer is defined as a smallholder farmer who sells at least 20 percent of their output on the market. Market access is the ability of farmers to seize market opportunities, to sell output. The literature on the determinants of market participation by smallholder farmers in developing countries was also presented. The factors that influence the level of market participation highlighted in the literature include the age of the smallholder farmer, gender, education, ownership of assets, land size and off-farm income. The following chapters encompass methods, research results and conclusions presented relating to the objectives. The next chapter discusses the area of the study and the methods used in the research.

Chapter 3: Research data and methods

3.1 Area of Study

South Africa has nine provinces, this study focused on the province of KwaZulu Natal (KZN). It is located on the east coast of South Africa, it borders three other SA provinces; Mpumalanga, Free States and Eastern Cape, as well as the countries of Mozambique, Swaziland, and Lesotho. The province of KZN is divided into ten districts and a metro that is in turn divided into 51 local municipalities.

Figure 1: Map of South Africa highlighting KwaZulu Natal province (Ngxulelo, 2020).

According to Statistics South Africa (2016), KwaZulu-Natal (KZN) is the most important smallholder province, which has 23% of all smallholders. About 24,9 percent of the 2.9 million agricultural households in South Africa in 2011 were located in KwaZulu-Natal (Statistics South Africa, 2013), making it the province with the most agricultural household. The climate, soils, and abundant access of water in the KZN make it the province with relatively high agricultural potential.

KZN Province has ten District Municipalities, the most of any province in South Africa, as well as 50 local municipalities. The study focused on only the two districts of KZN as Zululand and uMkhanyakude. Zululand is situated in the north-eastern part of KZN and is the largest district in the province. Zululand is primarily a rural district, because about half the area falls under the jurisdiction of traditional authorities, while the remainder consists of privately owned commercial farms or protected areas. uMkhanyakude is situated in the north-eastern part of KZN and it is the second-largest district in the province. The uMkhanyakude and Zululand districts were chosen because they are the largest districts in the KZN in terms of land size.

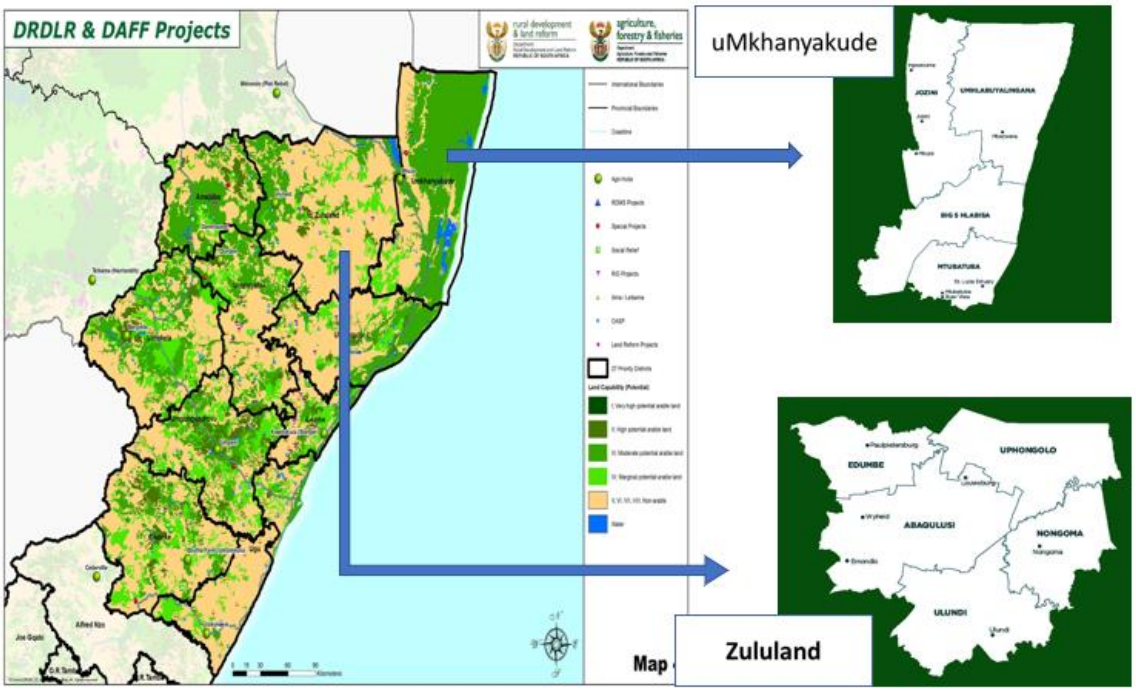

Figure 2: Map of KwaZulu-Natal showing the two districts in the case study (Edited DRDLR & DAFF, 2015 and KZN Online maps).

3.2 Data collection and methods of collection

The data was gathered through a household survey, using a questionnaire in a local language, through face-to-face interviews with smallholder farmers. The data was collected in April 2018 and it was for the 2017/2018 season. Multi-stage sampling was used in selecting the farmers, were at provincial and district level a purposive sampling to select provinces with the high number of smallholder farmers in RSA based on General Household Survey from

Statistics South Africa 2016. The same technique was further applied at the district level, where the largest districts in the province of KwaZulu Natal with a high number of smallholder farms were selected. “The purposive sampling design which was used is a non-probability sampling method whereby the researcher purposively interviews individuals meeting the criteria of interest with the hope that they will provide in-depth information required for the research project” (Leedy & Ormrod, 2005 cited in Raleting & Obi, 2015). At village and household level, random sampling was applied to select households who have sold at least 20 percent of their output in the previous season. These were selected from a list of a sample obtained from the data collected.

The questionnaire was designed to collect a range of data on amounts of crops and livestock production and the proportion sold, household characteristics which are: age, gender, education level of the household head, household size and household income, private assets variables such as farm size, off-farm income; transaction cost variables such as point of sale of output.

3.3 Data description and Analytical model used

A total of 229 farmers from the two districts were surveyed, 104 from Zululand district and 125 from uMkhanyakude district. The main livestock produced in those districts from the survey data were cattle, pigs, sheep, goats, and chicken. And the crops produced were maize, cabbage, and potatoes. These were the main crops that they put on the market. There were other miscellaneous crops produced by a very few such as leafy vegetables, madumbe and carrots, mostly for consumption purposes.

The data collected were coded in Microsoft Excel and then exported into Statistica for analysis. Descriptive statistics are used to explain the socio-economic aspects of the farmers. In addition to the descriptive analysis, multiple regression analysis was performed to estimate the parameters of the model. The independent variables included those theoretically expected to influence market participation decisions.

Table 1: A description of the variables used

Variable name	Description of variable and measurement	Hypothesized Effect on Market Participation
AGE	Age of the smallholder farmer (years)	Positive
GENDER	Gender of the smallholder farmer (Male=1, Female = 0)	Positive / Negative
EDUCATION	The education level of the smallholder farmer (None=1, Primary=2, Secondary=3, Passed matric=4, Tertiary=5)	Positive
FAMILY LABOUR	Labour that is provided by the members of the family (number)	Positive
EXTERNAL LABOUR	Labour that is hired from outside (number)	Positive
TRACTOR	Number of tractors owned (number)	Positive
CAR	Number of cars owned (number)	Positive
GARDEN SIZE	Size of the garden (in Ha)	Positive
FIELD SIZE	Size of the field (in Ha)	Positive
OTHER INCOME	Other non-farm income sources. (Yes =1, No = 0) Does the farmer have any other source of income?	Negative
HOUSEHOLD INCOME	Total income of the household in Rands	Negative

3.4 The market participation regression model

Following the work of Adepoju *et al*. (2015) and Rios *et al*. (2009), a sales index was used to estimate the level of market participation, where sales were expressed as a fraction of total output produced, see Equation 1. A value of zero would indicate a complete subsistence household while values greater than zero indicate households that participate in the market. This was calculated for each observation separately.

Equation 1:Formula for market participation (SI - sales index)

$$Market\ participation = \frac{Total\ value\ of\ output\ sales}{Total\ value\ of\ output\ production}$$

A Multiple Regression Model was used to examine the factors influencing the level of market participation. "One of the most useful aspects of the multiple regression model is its ability to identify the independent effects of a set of variables on a dependent variable."(Green, 2018) It was used for analysing the mean response of the variable MP (Market Participation), which changes according to the magnitude of the intervention of an independent variable. The specific Multiple regression Model for identifying the factors that affect the level of market participation of a household is formulated in the following way:

Equation 2: Econometric model for estimating market participation rate.

$$Y = \beta_o + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \beta_{10}X_{10} + \beta_{11}X_{11} + e.$$

Where, Y refers to the market participation level of a household and X_1 to X_{11} are explanatory variables which are hypothesised to affecting the level of market participation; β_o, to β_{11}, are parameters to be estimated; and e is the stochastic disturbance term.

After putting in the variables from the data collected, the regression model will be specified as follows:

Equation 3: Mathematical model for estimating market participation rate

$$MP = \beta_o + \beta_1\ AGE + \beta_2\ GENDER + \beta_3\ EDUCATION + \beta_4\ FAMILY\ LABOUR + \beta_5\ EXTERNAL\ LABOUR + \beta_6\ TRACTOR + \beta_7\ CAR + \beta_8\ GARDEN\ SIZE + \beta_9\ FIELD\ SIZE + \beta_{10}\ OTHER\ INCOME + \beta_{11}\ HOUSEHOLD\ INCOME$$

MP is the dependent variable Market Participation of the farmer. The farm products used in the calculation of market participation includes both livestock and crop products produced on the farm.

Chapter 4: Results

4 Introduction

In this chapter, descriptive statistics of the variables and the estimation results of the multiple regression are presented. The results will facilitate in identifying the factors that influence the intensity of smallholder farmer participation in the output market.

4.1 Descriptive statistics

4.1.1 Household characteristic

The age of surveyed smallholder farmers ranges from 21 to 85 years, with a median age of 51 years, see Table 2 and Figure 3. The farm households in the region are relatively young given that about 82 percent (188) of the smallholder farmer are in the economically active population age group of 15 to 64 years. The age group that has a high number of farmers is the age bracket between 51 to 60 years, followed by 41- to 50-year-olds.

Table 2: Household characteristics, Assets, and resources descriptive statistics

	Minimum	Maximum	Mean (median - age)	Std. Deviation
Age	21	85	51	13.22
External labour	0	50	4	5.80
Family labour	0	10	1	1.90
Total household income (monthly)	0	20 000	8 465	7 627.40
Tractor	0	2	0	0.36
Car	0	8	1	1.24
Field size	0.0	18.8	2.25	3.60

External labour, which is hired labour, ranges from no one to a maximum of 50 workers, with average workers of 4. The labour provided by family members ranges from a minimum of 0 to a maximum of 10 family member. Smallholder farmers that had no external/ hired labour used only family labour, and those that had a zero value of family labour only hire labour without participating in any farming activities themselves. The mean family labour is 1, meaning on average at least one member of the family provided the required farm labour. About 62 percent of smallholder farmers in the Zululand and uMkhanyakude districts are males while about 38 percent of the smallholder farmers are female farmers.

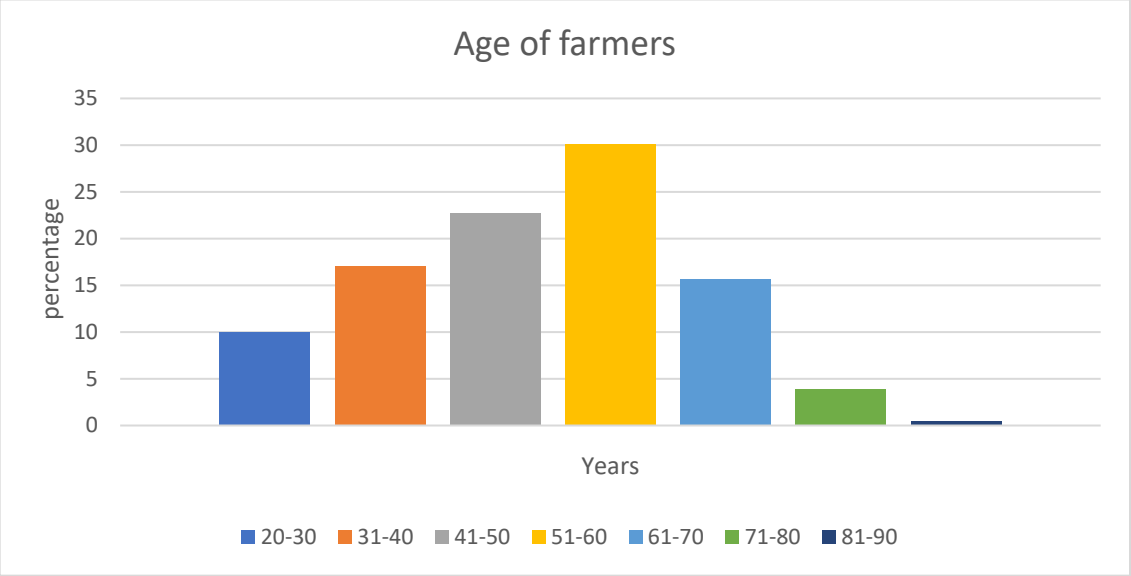

Figure 3: Age distribution of smallholder farmers.

Most households (about 80 percent) have formal education and about 20 percent of the smallholder farmers have no form of education. The education level that has the highest number of the smallholder farmer is the primary level (26 percent), followed by those that passed matric (21 percent), secondary education (17 percent) and tertiary education (16 percent).

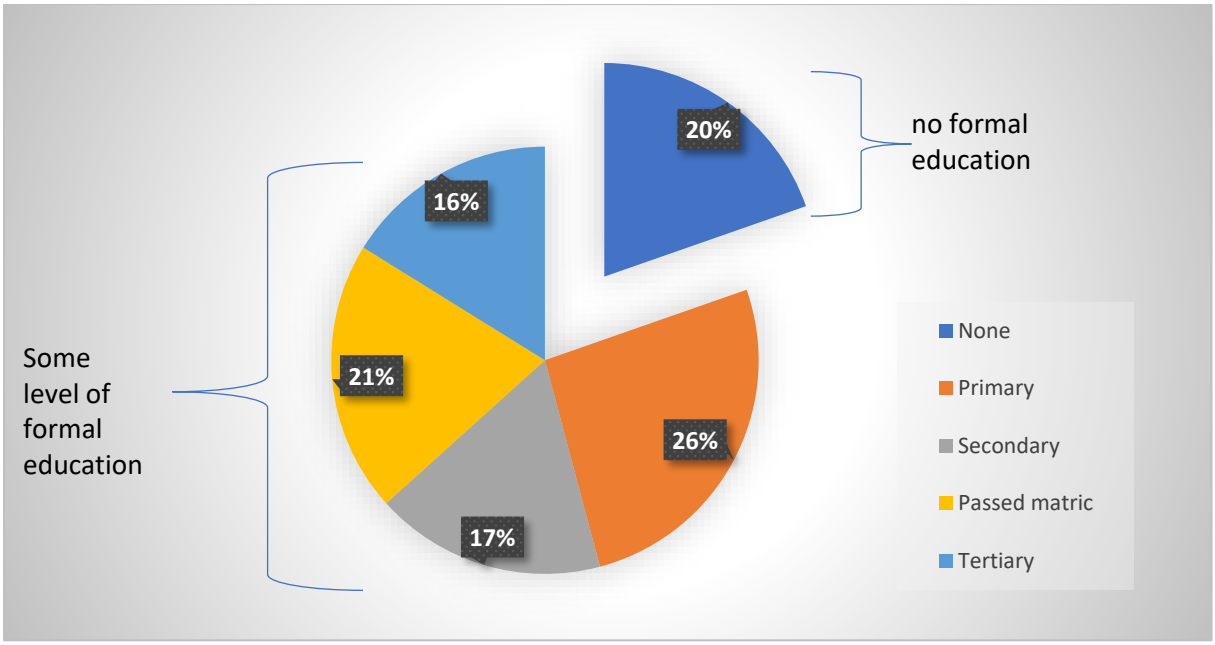

Figure 4: Education level of smallholder farmers.

Household income and source:

The average annual household income is R8 465 and ranges between nothing and R20 000. Household income flows mostly from sales of crop output (52.8 percent), and then from sales of livestock, and salaries and wages (both at 14 percent) as shown in Figure 5. The other sources of income are remittances, old age pension, grants and those that were not specified.

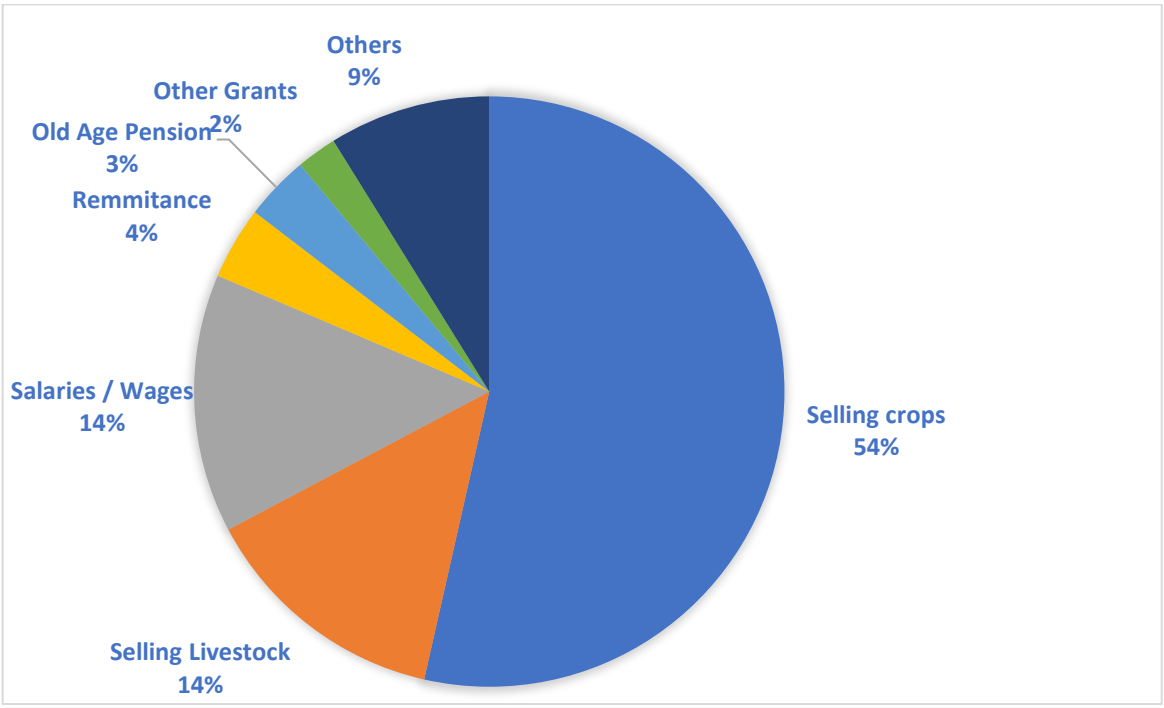

Figure 5: Primary sources of income of smallholder farmers.

4.1.2 Household Assets and Resources

Most smallholder farmers in the KZN does not own a tractor, as the mean of tractors owned is 0. The maximum number of tractors that a smallholder farmer own is 2. Not owning any tractor entails that most of the farmers in the study have a low level of production as they do not own the cultivation equipment, though they used traditional equipment, which compared to tractors have a low level of production.

The mean number of cars owned is 1, with a range of 0 cars to 8. Owning a car means that the farmers will have some level of market participation as they have the means to transport their products to the market.

4.2 Market participation of the smallholder farmers

4.2.1 Crop Market participation and marketing channels

Table 3 shows a statistical summary of crop value produced and sold with market participation status. The crop value produced and sold was calculated using the selling price and crops sold or produced, and for smallholder farmers that did not sell, the value of crops produced was calculated using the market price and crops produced. This statistical summary shows that a typical smallholder farmer produced crops valued at approximately R29 250.75 ranging from nothing to R1 328 000. From sales measurement, a typical smallholder farmer, on average, sold crops worth R26 105.84 ranging from selling 0 to R1 327 370. The crop market participation is computed to be 0.33 which indicates that on average a smallholder sells 33 percent of his total crop production ranging from selling nothing to 100 percent. Maize was the most produced and the most sold crop. This indicates that the level of market participation in the study areas is slightly higher than that of earlier studies that were 25%.

Table 3: Market Participation descriptive statistics

	Minimum	Maximum	Mean	Std. Deviation
Total livestock value produced	0	3 905 000.0	74 408.51	316 579.16
Total livestock value sold	0	1 100 000.0	14 150.13	79 260.56
MP -livestock	0	1	0.09	0.23
Total crop value produced	0	1 328 000	29 250.75	104 904.40
Total crop value sold	0	1 327 370	26 105.84	102 191.38
MP -crops	0	1	0.33	0.43
Total value produced	0	3 905 000.0	103 659.27	332 097.67
Total value sold	0	1 361 120.0	38 869.35	126 824.46
MP -farm	0	1	0.39	0.42

Most farmers sell their crop products to the neighbours (56 percent) and traders (formal and informal) (37 percent), Figure 6. This is because by selling to a trader and the neighbours, farmers will incur fewer costs as most cost (for instance transport costs) will be eliminated. The traders and neighbours mostly come to buy the crops at the farm gate. Thus, transaction costs are at a minimum level, which gives the farmer the incentive to use the traders and neighbours as marketing channels.

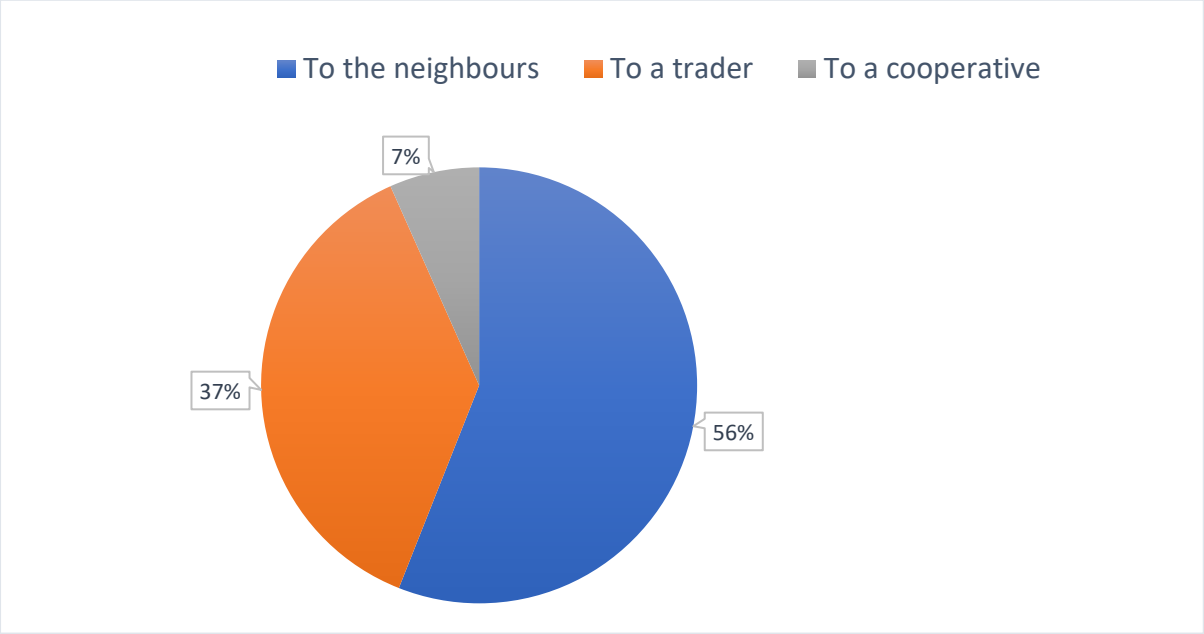

Figure 6: Crop marketing channels used by smallholders.

Though most (93 percent) smallholder farmers sell their produce to neighbours or traders, they have relatively low market participation (52 and 44 percent) if compared to the small group (7 percent) of producers that market 70 percent of their produce through cooperatives. This is because cooperatives of farmers reduce transaction costs and strengthen their bargaining power leading to high levels of market participation (Ochieng *et al.*, 2018). A study by Holloway *et al*., (1999), concluded that cooperatives are potential catalysts for mitigating transaction costs and stimulating entry into the market.

4.2.2 Livestock market participation

A statistical summary of livestock value produced and sold in the production season under study within the livestock market participation status of the sample smallholder farmers are shown in Table 3. The summary shows that a typical smallholder farmer produced livestock valued at approximately R74 409 ranging from nothing to R3 905 000. The farmers sold on average; livestock valued at R14 150 ranging from selling nothing to R1 100 000. The market participation for the typical smallholder farmer is computed to be 0.09 which indicates that on average a typical household sells nine percent of its total livestock production. Cattle was the most produced and most sold livestock. The market participation of 9 percent indicates that the level of livestock market participation (0.09) in the study areas is very low compared to crops market participation (0.33). The livestock market participation includes the selling of both animals and their products.

Livestock marketing channels used by smallholder farmers in the KZN are shown in Figure 7. A total of 57 percent of farmers sell their livestock products to their neighbours and 29 percent to traders. Selling to a trader and the neighbours reduce transaction costs as it all happens at the farms. The rest of the farmers sell their produce to cooperatives (4 percent), to the nearest towns (2 percent) and other markets (8 percent).

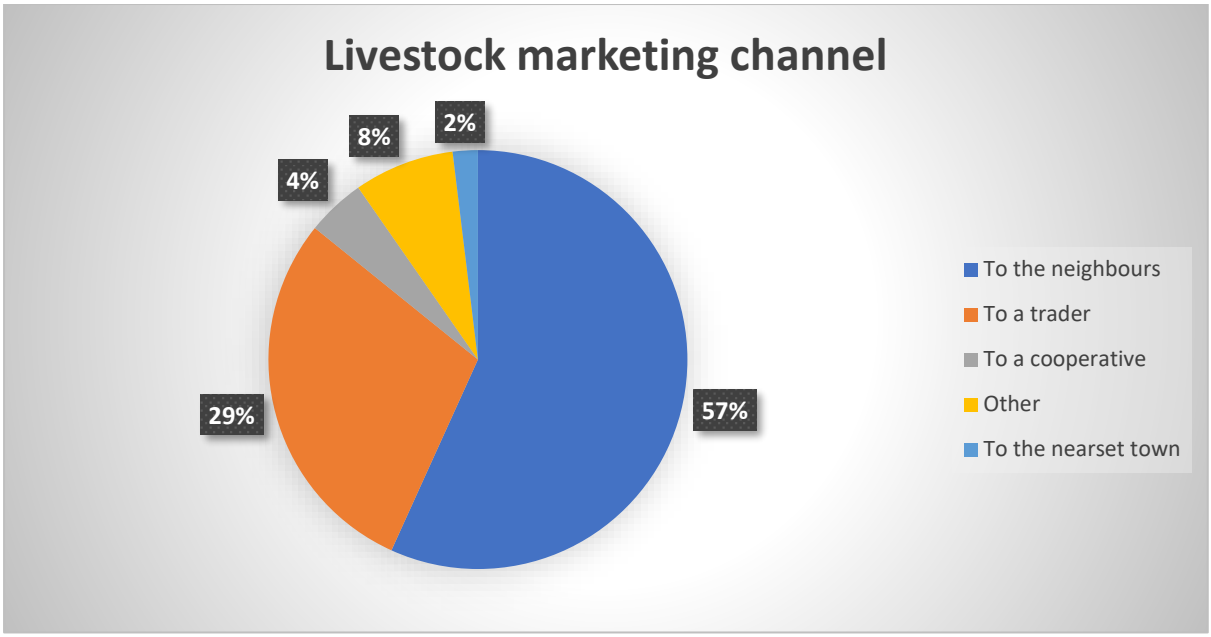

Figure 7: Livestock marketing channels used by study smallholders.

All the marketing channels for livestock had a lower market participation rate of 20 percent or below. The livestock marketing channel that had the highest market participation rate (about 20 percent) compared to the others, was selling to the nearest town. The smallholders that sold to their neighbours (57 percent) put about 18 percent of their livestock output on the market. Those that sold to a trader (29 percent) put about six percent of their livestock output on the market. The rest of the livestock marketing channels, that is selling through cooperatives and other channels had low market participation rates of four and two percent, respectively.

Most livestock studies use market off-take rate to determine farmers market participation rate, though it was observed by Sotsha *et al.* (2017) that using the off-take rate alone was insufficient. Market off-take rate is defined as the number of animals sold as a percentage of animals kept in a year (Coetzee *et al.*, 2005; Montshwe, 2006; Musemwa *et al.*, 2010). Low market off-take rates between five and 10 percent have been reported in the communal cattle production system of Africa (Musemwa *et al.*, 2010; Nkhori, 2004; Sotsha *et al.*, 2017). Community-level off-take rates ranged from five to 18 %, with an overall average of one percent (Ndoro *et al.*, 2015).

It is difficult to compare the market participation rate to the market take-off rate as the measurement and calculations are different. Though it is difficult to do the comparisons, the

participation of farmers in the market is overall low using both market participation and take-off rate.

The low take-off rate is because smallholder farmers do not keep livestock exclusively for marketing purpose, but as a means of storing wealth that is only converted into cash during times of crop production failure, and they provide draught power, organic fertilizer, and fuel etc amongst other reason (Coetzee *et al*., 2005; Sotsha *et al.*, 2017). High transaction costs are included in other major challenges (Sotsha *et al.*, 2017).

4.2.3 Overall market participation

Analysis of household market participation indicates that the households in the study area are moderate market participators given that they sell an average of 33 percent of their field crops and nine percent of their livestock produce. A statistical summary of crop value produced and sold with the market participation status of the sample households are shown in Table 3. The statistical summary given in Table 3 shows that a typical smallholder farmer produced products valued at approximately R103 659.27 ranging from nothing to R3 905 000.0. The smallholder farmer that had nothing did not produce anything in the season under study. From the dimension of sales, a typical smallholder farmer, on average, sold products worth R38 869.35 ranging from selling nothing to R1 361 120. The market participation for the typical smallholder farmer is computed to be 0.39 which indicates that on average a typical smallholder farmer sells 39 percent of his total production ranging from selling nothing to 100 percent. This indicates that the level of market participation in the study areas is relatively low.

4.3 Regression results.

To achieve the purpose of the study, several variables, which were believed to influence the level of market participation based on the literature review conducted, were included in a multiple regression model. A stepwise logistic regression model was used in the further selection of the predictive variables for the parsimonious regression model. This stepwise regression or variable selection procedure considers all variables subsets, which are compared to the full model consisting of all variables, based on an approximation to the usual likelihood ratio test (Peduzzi *et al*., 1980). The regression results are presented in Table 4.

Table 4: Results of the multiple regression analysis

The sample of smallholder farmers was 229 and in the regression model, 29 were excluded because they had some missing values in the sample. The regression model automatically deleted the observations that had some missing values.

N=200	Regression Summary for Dependent Variable: MP farm (DATA KZN 20190802) R= .32019300 R²= .10252356 Adjusted R²= .07462274 CV-R^2=0.06						
	b*	Std.Err. of b*	b	Std.Err. of b	t(193)	p-value	# times in best 20
Intercept			0.949555	0.241280	3.93548	0.000116	
Age	-0.136334	0.069315	-0.008444	0.004293	-1.96687	0.050631	20
Totalhouseholdincome(monthly)	-0.071166	0.078800	-0.000008	0.000008	-0.90312	0.367589	7
Other source of income	-0.075202	0.076868	-0.138850	0.141925	-0.97833	0.329134	10
Tractor	-0.081750	0.076148	-0.181994	0.169522	-1.07357	0.284356	14
Car	-0.098219	0.073548	-0.068334	0.051169	-1.33545	0.183303	20
Field_size	0.270109	0.073400	0.058726	0.015958	3.67995	0.000303	20
Gender	Excluded						2
Education	Excluded						7
externallabour	Excluded						9
familylabour	Excluded						9
Garden_size	Excluded						2

The Market participation of the smallholder farmer

The decision to participate in the market is significantly determined by only two factors at a five percent significant level, which are the age of the smallholder farmer and farm size.

Age:

The age of the smallholder farmer variable did not have the expected positive sign. The age of the smallholder farmer was significant and related negatively to market participation. Age is negatively associated with the probability of selling output on the market. The coefficient is -0.14, which means that an increase in the age by one year will lead to a decrease in the level of market participation of a farmer by 14 percent. This implies that older farmers are less likely to participate in the market compared to the younger generation. They are likely to be more concerned about being food secure, as the younger generation would want to enhance their quality of life thus, they will engage in the market. The older farmers are risk-averse, and the young ones are risk-adverse and energetic. This finding is consistent with the findings of Adepoju *et al*., (2015); Geoffrey *et al.*, (2013); Mbitsemunda & Karangwa, (2017); Mignouna *et al.*, (2015); Musah *et al*., (2014). This finding opposes that of Musara *et al.*, (2018), which had a positive influence on the market participation of farmers in the sorghum market.

Field size:

Field size has a positive sign as expected. It is positively related to market participation, with a coefficient of 0.27. An increase in the field size by one hectare will result in an increase in the level of market participation by 27 percent. There is a greater opportunity for increased surplus production on larger farm size and subsequent quantity sold. Limited land size equals the inability to produce a surplus for the market. This finding concurs with that of Maponya *et al.*, (2016), were land size has a positive association with market participation.

Income:

There is no statistically significant relationship between market participation and income. There is a correlation between income and market participation but cannot prove causality as the significant level (37 percent) is greater than five percent. However, the results seem to suggest that there could be a negative relationship between the two, with a coefficient of -0.07 smallholder farmer income and -0.075 other source of income. The coefficient of household income (-0.075) suggests that an increase in the income by a rand will decrease the level of market participation by seven percent. The coefficient of other sources of income means that an increase of one unit, which is having other off-farm sources of income, decreases the level of market participation by 7.5 percent.

Figure 10 supports this suggested result as it shows the mean level of market participation (at 0.5) of farmers with no other source of income is above that of the farmers with other sources of income (about 0.36). The negative sign on off-farm income is consistent with the findings of Mbitsemunda & Karangwa (2017) in the Nyanza District of Southern Province, Rwanda. Smallholder farmers with high off-farm income are apt to be non-participants in the agricultural market as they lean towards generating cash from off-farm activities rather than agricultural commodities.

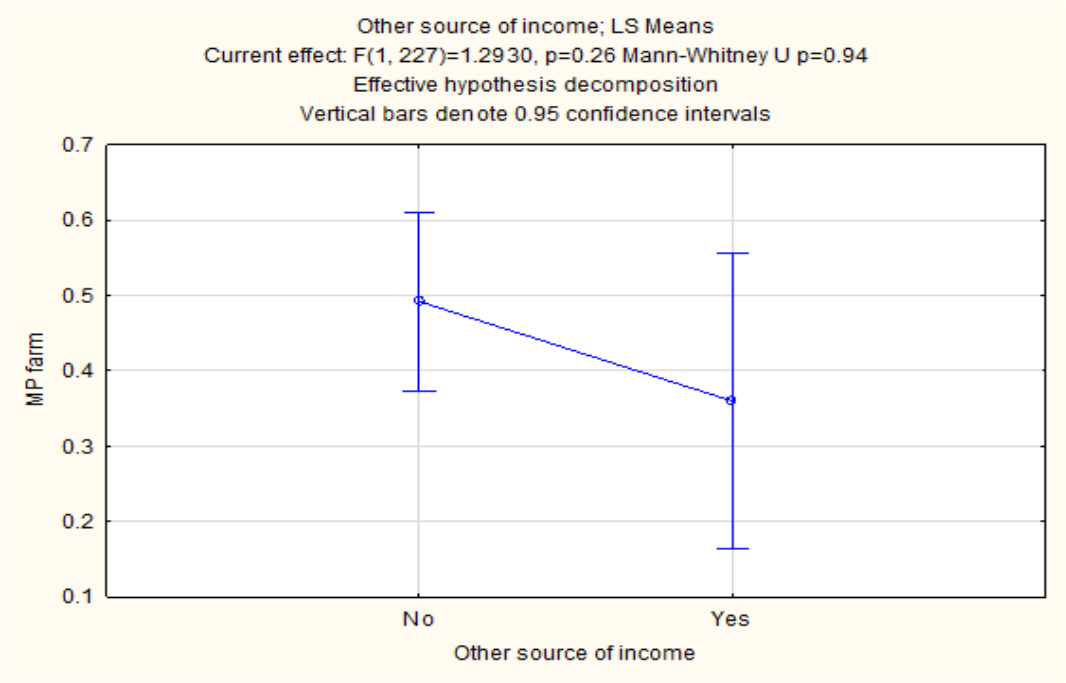

Figure 8: Market participation with and without other non-farm sources of income

Tractors and Cars (Assets)

These are the other variables that were included in the model by the stepwise analysis, though they have no statistically significant relationship with the Market participation. These are namely Tractor (-0.081750) and Car (-0.098219). The results suggest that an increase in the number of tractors and cars owned by a unit will decrease the level of market participation by 8.1 percent and 9.82 percent, respectively. All the other factors remaining constant, increasing the number of tractors owned will not change the production capacity of the resources available. Rather, the tractor will be rented out to other smallholder farmers, thus less time to focus on the production on their farm, which will, in turn, reduce market participation level. An increase in the number of cars owned is directly linked to an increase in income levels, which reduces the incentives of smallholder farmers to produce more and participate in the market.

Gender, education, labour, and garden size.

Field size and garden size were split to help smallholder farmer distinguish between the field size and garden size in the estimation of the land they use. The garden is planted throughout the year and the field is seasonal.

These are the non-significant variables that were excluded from the model because their inclusion does not improve the model's significance level, but rather reduces it. These variables appeared in the subset model a few times meaning that they had no significant value to the model. The variable, other sources of income, which also appeared in the subset model a few times, was forcefully included in the model as it was part of one of the hypotheses for the research which had to be tested.

Chapter 5: Summary, Conclusion, Policy implications and Recommendation.

5 Introduction

This chapter first summaries the research results from the case study of the two districts in KZN, uMkhanyakude and Zululand districts, that were investigated. Conclusions and discussion of policy implications of the research come next. Finally, the chapter is concluded by recommendations, and areas for further studies are noted.

The agricultural sector plays a key role in ensuring household food security and reducing poverty through its provision of food, creation of employment and generation of marketable surpluses. Achieving this objective is the responsibility of the millions of farmers. In South Africa, less than 40 000 commercial farmers produce 95 percent of agricultural output and the balance is produced by more than 1.2 million smallholder farmers. Smallholder farmers face several challenges, chief among which is market access and participation.

Smallholder farmers in this research were defined as farmers that sold more than 20 percent of their produce in the market. There is high potential in market-oriented agriculture for smallholder farmers to derive livelihood and improve their standard of living.

5.1 Summary

Using household-level data collected from 229 smallholder farmers in the two districts, uMkhanyakude, and Zululand, in the province of KwaZulu Natal in South Africa, this study investigated the factors affecting the level of market participation of smallholder farmers. The study results revealed that the areas of study have a low crop market participation of 33 percent, a very low livestock market participation of nine percent, and overall market participation of 39 percent. The main objectives of the study were identifying the factors affecting market participation, identifying possible marketing channels and policy implications thereof. Multiple regression analysis was performed in the analysis.

Following the objectives of the study, marketing channels were investigated in relation to market participation. Marketing channels for livestock did not have any significant effects

on market participation. For crops, marketing channels had some effect on market participation. Smallholder farmers that sold their crop output to the neighbour and traders had a lower market participation rate (44 and 52 percent respectively) compared to a few that sold their crop output through cooperative (70 percent). This is because cooperatives of farmers strengthen their bargaining power leading to high levels of market participation (Ochieng *et al.*, 2018).

It was hypothesised that smallholder farmers that have other sources of income (Non-farm income) have a lower market participation rate given lower production, and smallholder farmers that have access to additional land have a higher market participation rate. It was also hypothesised that smallholder farmers that have access to additional land have a higher market participation rate. A farmer that has additional land, larger land, have the capacity to produce more surplus that they will put on the market, thus increased the level of market participation. The third hypothesis was that older smallholder farmers in terms of age had a higher market participation rate given many years of experience.

To measure the participation rate, the study used data that was gathered through a household survey. Multi-stage sampling was used in selecting the smallholder farmers to interview.

It was found that factors that influenced the level of market participation were age and field size. Age had a negative relationship with market participation and field size had a positive relationship with market participation. The age of the smallholder farmer variable was significant, negative (-0.14), and did not have the expected positive sign. An increase in the age by one year will lead to a decrease in the level of market participation of a farmer by 14 percent. Younger farmers are less risk-averse, innovative, energetic and more enthusiastic to participate in the market (Abdullah *et al.*, 2018; Geoffrey *et al.*, 2013).

Field size has a positive sign as expected, with a coefficient of 0.27. An increase in the field size by one hectare will result in an increase in the level of market participation by 27 percent. Increasing the land size will leave room for expansion and leads to high productivity, leading to a higher market participation rate.

Income could have had a negative relation with the participation in the market if it were statistically significant. There is a correlation between income and market participation. The results suggest that there could be a negative relationship between the two, with a coefficient of -0.07 household income and -0.075 other source of income. The coefficient of household

income (-0.075) suggests that an increase in the income by a rand will decrease the level of market participation by seven percent. The coefficient of other sources of income means that an increase by a unit-which is having other off-farm sources of income- decreases the level of market participation by 7.5 percent. Having other sources of income reduces the incentives for smallholder farmers to participate in the market.

Tractors and Cars (Assets) variables were included in the model with coefficients of -0.08175 and -0.09822 respectively, though they did not have a statistically significant relationship with the market participation of participants. The results suggest that an increase in the number of tractors and cars owned by a unit will decrease the level of market participation by 8.1 percent and 9.82 percent, respectively.

Gender, education, labour, and garden size were non-significant variables that were excluded from the model because their inclusion does not improve the model's significance level.

5.2 Synthesis and policy recommendations

The findings of this research have some important policy implications. It has been determined that market participation in the area is influenced by age and land size. Younger smallholder farmers had a higher participation rate in the market compared to older smallholder farmers. Therefore, policies that encourage younger smallholder farmers to go into farming should be implemented. Such policies will influence smallholder market participation as younger people are not risk averse. Smallholder farmers that have access to a larger piece of land have a high participation rate in the market. Therefore, efforts should be directed to increasing land portions or sizes for smallholder farmers in the KZN.

The results showed that land size and age are related to market participation, then younger smallholder farmers that have larger potions of land will participate more and have a high level of participation rate. Policies promoting land distribution to younger farmers should be promoted and implemented. Policies that support younger smallholder farms expansion of arable land and/or relocation to new larger lands could increase productivity and market participation.

The important marketing channel for crops was selling through cooperatives. A few of the smallholder farmers that sold through cooperatives had a higher market participation

rate. Therefore, smallholder farmers could increase their market participation by joining cooperatives or forming one as a marketing channel. Further investigation on the types of cooperatives that would thrive in this environment is recommended as many former cooperatives failed.

Policies should be put in place to foster the development of cooperative societies, support the existing ones, educate farmers on the management of cooperatives, funding the cooperatives, enhancing the incentives for smallholder farmers to join, as well as facilitating that process. This should come after further investigation on the types of cooperatives that the smallholder farmers that had higher market participation flourished in. This will boost the market participation of smallholder farmers. In these cooperatives, farmers can have a common voice to get information about the market situation and assist one another via collective works.

5.3 Recommendations for further study

The finding of this study is specifically relevant to uMkhanyakude, and Zululand districts of KZN in South Africa. It is therefore proposed:

That a similar study should be done in other smallholder farming areas of South Africa to establish the generalisability of the results. Whilst market participation studies typically consider aggregated market participation, this study has shown that there are substantial differences between the broad categories of field crop and livestock production. A logical extension of this study is to disaggregate market participation by product. Whilst this will be more data-intensive, it would improve the goodness of fit of models and thus predictability. In addition, the same farmers should be examined over time to determine if they had not changed their marketing patterns or behaviour. The assumption in the analysis is that a farmer who participated in the period of the study will continue to do so.

That the marketing channels be investigated farther than what was done. Investigating what affects the level of the participation rate in each channel would explain the differences better.

During the questionnaire administration process, some smallholder farmers still expected free input assistance, although it was made clear that no assistance was going to be given for responding to the questionnaire. Most smallholder farmers did not keep records of

output produced and prices of these output, thus they ended up estimating the prices and the amount produced. Given these observations, there might be some biases, however, very limited, on total production levels on different crops and livestock.

Some smallholder farmers were not sure how to quantify their land, so the enumerators helped them and used the rugby field as an example of a hectare, which is approximately 1.0008 hectare. Given this, there might be some bias on the field size, however very limited.

Reference

Abdullah *et al.* (2018) 'Determinants of commercialization and its impact on the welfare of smallholder rice farmers by using Heckman's two-stage approach', *Journal of the Saudi Society of Agricultural Sciences*. The Authors. doi: 10.1016/j.jssas.2017.06.001.

Adepoju, A. O., Owoeye, I. T. and Adeoye, I. B. (2015) 'Determinants of Market Participation among Pineapple Farmers in Aiyedaade Local Government Area, Osun State, Nigeria', *International Journal of Fruit Science*. Taylor & Francis, 15(4), pp. 392–404. doi: 10.1080/15538362.2015.1015763.

Aliber, M. and Hart, T. G. B. (2009) 'Should subsistence agriculture be supported as a strategy to address rural food insecurity?', *Agrekon*, 48(4), pp. 434–458. doi: 10.1080/03031853.2009.9523835.

Ayinke, O. O. (2011) *Contract Farming in Developing Emerging Farmers in South Africa : Exploring the Gledhow Mansomini Sugarcane Scheme*.

Chamberlin, J. (2008) *It's a small world after all: Defining smallholder agriculture in Ghana*, *IFPRI Discussion Paper 00823*.

Chibanda, M., Ortmann, G. F. and Lyne, M. C. (2009) 'Institutional and governance factors influencing the performance of selected smallholder agricultural cooperatives in KwaZulu-Natal', *Agrekon*, 48(3), pp. 293–315. doi: 10.1080/03031853.2009.9523828.

Coetzee, L., Montshwe, B. D. and Jooste, A. (2005) 'The marketing of livestock on communal lands in the Eastern Cape Province: contraints, challenges and implications for the extension services', *South African Journal of Agricultural Extension*, 34(1), pp. 81-103–103.

DAS (2018) *Abstract of Agricultural Statistics 2018*. Pretoria: Directorate of Agricultrural Statistics, South Africa.

Ehui, S., Benin, S. and Paulos, Z. (2009a) 'Policy options for improving market participation and sales of smallholder livestock producers: A case study of Ethiopia', *2nd EAF International Conference on Contemporary Development Issues in Ethiopia, Addis Ababa, Ethiopia, 11-13 July 2003*, (August 2009), pp. 1–18.

Ehui, S., Benin, S. and Paulos, Z. (2009b) 'Policy Options for Improving Market Participation and Sales of Smallholder Livestock Producers: A case study of Ethiopia', (August 2009),

pp. 16–22.

Fraser, G. C. G. *et al.* (2012) *Unlocking markets to smallholders*. doi: 10.3920/978-90-8686-168-2.

Gebremedhin, B. and Jaleta, M. (2012) 'Market Orientation and Market Participation of Smallholders in Ethiopia: Implications for Commercial Transformation'.

Geoffrey, S. K. *et al.* (2013) 'Determinants of Market Participation among Small-Scale Pineapple Farmers in Kericho County , Kenya', *Economics and Sustainable Development*, 4(19), pp. 59–67. doi: 10.1016/S1344-6223(01)00008-6.

Gerbremedhin, B. and Moti, J. (2010) 'Commercialization of Smallholders: Is Market Participation Enough?', in *Joint 3rd African Association of Agricultural Economists (AAAE) and 48th Agricultural Economists Association of South Africa (AEASA) Conference, Cape Town, South Africa*, p. P22.

Graeub, B. E. *et al.* (2016) 'The State of Family Farms in the World', *World Development*, 87, pp. 1–15. doi: 10.1016/j.worlddev.2015.05.012.

Green, W. H. (2018) *Econometric Analysis: Fifth edition*. doi: 10.1007/978-3-540-78389-3.

Hazell, P. *et al.* (2007) *The Future of Small Farms for Poverty Reduction and Growth*.

Holloway, G., Nicholson, C. and Delgado, C. (1999) 'Agroindustrialization through institutional innovation: Transaction costs, cooperatives and milk-market development in the Ethopian highlands', *International Food Policy Research Institute*.

Jaleta, M., Berhanu, G. and Hoekstra, D. a (2009) 'Smallholder commercialization: Processes, determinants and impact. Discussion Paper No. 18. Improving Productivity and Market Success (IPMS) of Ethiopian Farmers Project, ILRI (International Livestock Research Institute), Nairobi, Kenya. 55 pp ii', (18), pp. v, 49 p. doi: 10.1111/j.1540-5982.2012.01729.x.

Jari, B. and Fraser, G. C. G. (2009) 'An analysis of institutional and technical factors influencing agricultural marketing amongst smallholder farmers in the Kat River Valley, Eastern Cape Province, South Africa', *African Journal of Agricultural Research*, 4(11), pp. 1129–1137.

Key, N., Sadoulet, E. and Janvry, A. De (2000) 'Transactions Costs and Agricultural Household Supply Response', 82(May), pp. 245–259.

Khapayi, M. (2013) *Commercialisation of emerging farmers in the Eastern Cape province: Identification of limiting factors that inhibitt progression from subsistence to*

commercial farming.

Khapayi, M. and Celliers, P. R. (2016) 'Factors limiting and preventing emerging farmers to progress to commercial agricultural farming in the King William's town area of the Eastern Cape province, South Africa', *S.Afr. Tydskr. Landbouvoorl./S. Afr. J. Agric. Ext.,* 44(1), p. 2016. Available at: http://dx.doi.org/10.17159/2413-3221/2016/v44n1a374%0AKhapayi.

Kirsten, J. F. and Van Zyl, J. (1998) 'Defining small-scale farmers in the South African context', *Agrekon*, 37(4), pp. 551–562. doi: 10.1080/03031853.1998.9523530.

Lapar, M. L., Holloway, G. and Ehui, S. (2003) 'Policy options promoting market participation among smallholder livestock producers: A case study from the Phillipines', *Food Policy*, 28(3), pp. 187–211. doi: 10.1016/S0306-9192(03)00017-4.

Latt, E. A. and Nieuwoudt, W. L. (1988) 'Identification of plot size effects on commercialization of small-scale agriculture in Kwazulu', *Development Southern Africa*, 5(3), pp. 371–382. doi: 10.1080/03768358808439410.

Liebenberg, F. (2012) *South African Agricultural Production, Productivity and Research Performance in the 20th Century*. University of Pretoria.

Lowder, S., Skoet, J. and Raney, T. (2016) 'The Number, Size, and Distribution of Farms, Smallholder Farms, and Family Farms Worldwide', *World Development*, 87, pp. 16–29.

Makhura, M. T. (2001) 'Overcoming Transaction Costs Barriers To Market Participation Participation of Smallholder Farmers in the Northern Province of South Africa', (June), pp. 1–207.

Maponya, P *et al.* (2016) 'An Evaluation of Market Participation Challenges of Small Holder Farmers in Zululand District, Kwazulu Natal, South Africa', *African Journal of Business and Economic Research*, 11(1), pp. 117–142.

Maponya, P. *et al.* (2016) 'Factors Enhancing Market Participation : A Case of Small Holder Farmers in Zululand District , Kwazulu Natal in South Africa', 11(1), pp. 117–139.

Masters, W. A. *et al.* (2013) 'Urbanization and farm size in Asia and Africa: Implications for food security and agricultural research', *Global Food Security*. Elsevier, 2(3), pp. 156–165. doi: 10.1016/j.gfs.2013.07.002.

Mathenge, M. *et al.* (2010) 'Participation in Agricultural Markets among the Poor and Marginalized: Analysis of Factors Influencing Participation and Impacts on Income and Poverty in Kenya', *TEGEMEO Institute OF Agricultural Policy and Development and*

World Agroforestry Centre, (July), pp. 1–137.

Mbitsemunda, J. P. K. and Karangwa, A. (2017) 'Analysis of Factors Influencing Market Participation of Smallholder Bean Farmers in Nyanza District of Southern Province, Rwanda', *Journal of Agricultural Science*, 9(11), p. 99. doi: 10.5539/jas.v9n11p99.

Mdlalose, N. (2016) *Marketing of fresh produce by smallholder farmers: A case study of uThungulu District Municipality, KwaZulu-Natal, South Africa*.

Mignouna, D. B. *et al.* (2015) 'Drivers of Market Participation Decisions among Small-scale Farmers in Yam Growing Areas of Nigeria and Ghana'.

Mtombeni, S. *et al.* (2019) *An analysis of infrastructure and inputs as a barrier to entry and expansion for emerging farmers*.

Musah, A. B., Bonsu, O.-A. Y. and Seini, W. (2014) 'Market participation of smallholder maize farmers in the upper west region of Ghana', *African Journal of Agricultural Research*, 9(31), pp. 2427–2435. doi: 10.5897/ajar2014.8545.

Musara, J. P. *et al.* (2018) 'Market participation and marketing channel preferences by small scale sorghum farmers in semi-arid Zimbabwe', *Agrekon*. Taylor & Francis, 57(1), pp. 64–77. doi: 10.1080/03031853.2018.1454334.

Musemwa, L. *et al.* (2008) 'Nguni cattle marketing constraints and opportunities in the communal areas of South Africa: Review', *African Journal of Agricultural Research*, 3(4), pp. 239–245.

Musemwa, L. *et al.* (2010) 'Low cattle market off-take rates in communal production systems of South Africa: causes and mitigation strategies.', *Journal of Sustainable Development in Africa*, 12(5), pp. 209–226.

Narayanan, S. and Gulati, A. (2002) 'Globalization and Smallholders: A Review of Issues Approaches and Tentative Conclusion', *Globalization of Food and Agriculture and the Poor*, pp. 1–43.

Ndoro, J. T. *et al.* (2015) 'Farmers ' Choice of Cattle Marketing Channels in Rural South Africa : A Transaction Cost Economics Perspective'.

Ndoro, J. T., Mudhara, M. and Chimonyo, M. (2015) 'Farmers' choice of cattle marketing channels under transaction cost in rural South Africa: a multinomial logit model', *African Journal of Range and Forage Science*, 32(4), pp. 243–252. doi: 10.2989/10220119.2014.959056.

Ngarava, S., Phetshe, M. and Mushunje, A. (2019) 'Market awareness and participation for

cattle farmers in the kaonafatso ya dikgomo (KyD) scheme in Kwazulu-Natal Province, South Africa', *Agriculture (Switzerland)*, 9(10). doi: 10.3390/agriculture9100215.

Ngqangweni, S. *et al.* (2010) 'Measuring and tracking smallholder market access in South Africa', *National Agricultural Markerting council*, 23(6), pp. 382–392.

Ngxulelo, V., 2020. 'Why Kwazulu-Natal Overview'. [online] Tikzn.co.za. Available at: <https://www.tikzn.co.za/open.php?cat=why_kzn&page=overview> [Accessed 6 October 2020].

Nkunjana, T. and Zantsi, S. (2018) 'The degree and determinants of crop commercialization among emerging smallholder farmers in the former homelands of the Eastern Cape Province of South Africa .'

Ochieng, J. *et al.* (2018) 'Strengthening collective action to improve marketing performance: evidence from farmer groups in Central Africa', *Journal of Agricultural Education and Extension*. Taylor & Francis, 24(2), pp. 169–189. doi: 10.1080/1389224X.2018.1432493.

Okoye, B. C. *et al.* (2016) 'Effect of transaction costs on market participation among smallholder cassava farmers in central Madagascar', *Cogent Economics and Finance*. Cogent, 4(1), pp. 1–20. doi: 10.1080/23322039.2016.1143597.

Omiti, J., Otieno, D., Nyanamba, T., Mc Cullough, E., Omiti, J. M., Otieno, D. j., *et al.* (2009) 'Factors influencing the intensity of market participation by smallholder farmers: A case study of rural and peri-urban areas of Kenya', *The African Journal of Agricultural and Resource Economics*, 3(1), pp. 57–82. Available at: http://ageconsearch.umn.edu/bitstream/56958/2/0301Omiti - FINAL.pdf.

Omiti, J., Otieno, D., Nyanamba, T., Mc Cullough, E., Omiti, J. M., Otieno, D. J., *et al.* (2009) 'Factors influencing the intensity of market participation by smallholder farmers: A case study of rural and peri-urban areas of Kenya', *The African Journal of Agricultural and Resource Economics*, 3(1), pp. 57–82. Available at: http://ageconsearch.umn.edu/bitstream/56958/2/0301Omiti - FINAL.pdf.

Osmani, A. G. and Hossain, E. (2015) 'Market participation decision of smallholder farmers and its determinants in Bangladesh', *Ekonomika poljoprivrede*, 62(1), pp. 163–179. doi: 10.5937/ekoPolj1501163G.

Otekunrin, O. A., Momoh, S. and Ayinde, I. A. (2019) 'Smallholder Farmers' Market Participation: Concepts and Methodological Approach from Sub-Saharan Africa', *Current Agriculture Research Journal*, 7(2), pp. 139–157. doi: 10.12944/carj.7.2.02.

Peduzzi, P. N., Hardy, R. J. and Holford, T. R. (1980) 'A Stepwise Variable Selection Procedure

for Nonlinear Regression Models', *Biometrics*, 36(3), pp. 511-516 (6 pages). doi: 10.2307/2530219.

Poole, N. (2017) *Smallholder Agriculture and Market Participation*. doi: 10.3362/9781780449401.

Raleting, P. M. and Obi, A. (2015) 'An Analysis of Institutional Factors Influencing Vegetable Production amongst Small-Scale Farmers in Six Vegetable Projects of the Nkonkobe Local Municipality', *Journal of Agricultural Science*, 7(6), pp. 184–196. doi: 10.5539/jas.v7n6p184.

Randela, R., Alemu, Z. G. and Groenewald, J. A. (2008) 'Factors enhancing market participation by small-scale cotton farmers', *Agrekon*, 47(4), pp. 451–469. doi: 10.1080/03031853.2008.9523810.

Rios, A. R., Masters, W. A. and Shively, G. E. (2008) 'Linkages between Market Participation and Productivity : Results from a Multi-Country Farm Household Sample', in *Prepared for presentation at the American Agricultural Economics Association Annual Meeting*, pp. 1–33.

Rios, A. R., Shivley, G. E. and Masters, W. A. (2009) 'Farm Productivity and Household Market Participation: Evidence from LSMS Data', *Development*.

Shuman, D. and Epsky, N. D. (1998) 'Smallholder market participation under transaction costs', *American Entomologist*.

Sikwela, M. M. (2013) *The Impact of Farmer Support Programmes on Market Access of smallholder farmers in the Eastern Cape and KwaZulu Natal provinces, South Africa*. doi: 10.1016/j.omega.2014.11.007.

Sinyolo, S., Mudhara, M. and Wale, E. (2014) 'The impact of smallholder irrigation on household welfare: The case of Tugela Ferry irrigation scheme in KwaZulu-Natal, South Africa', *Water SA*, 40(1), pp. 145–156. doi: 10.4314/wsa.v40i1.18.

Sinyolo, S., Mudhara, M. and Wale, E. (2017) 'The impact of social grant dependency on smallholder maize producers' market participation in South Africa: Application of the double-hurdle model', *South African Journal of Economic and Management Sciences*, 20(1), pp. 1–10. doi: 10.4102/sajems.v20i1.1474.

Sotsha, K. *et al.* (2017) 'Factors influencing communal livestock farmers' participation into the National Red Meat Development Programme (NRMDP) in South Africa: the case of the Eastern Cape Province', *OIDA International Journal of Sustainable Development*, 11(01),

pp. 73–80.

Statistics South Africa (2004) *Provincial Profile 2004 KwaZulu-Natal*.

Statistics South Africa (2013) 'Census 2011 Agricultural households Key Highlights Report', Report No., pp. 3–30.

Zantsi, S., Greyling, J. C. and Vink, N. (2019) 'Towards A Common Understanding Of "emerging Farmer" In A South African Context Using Data From A Survey Of Three District Municipalities In The Eastern Cape Province', *South African Journal of Agricultural Extension (SAJAE)*, 47(2). doi: 10.17159/2413-3221/2019/v47n2a505.